

**[0001]      COMMUNICATION DEVICE HAVING MULTIPLE KEYPADS****[0002]                      BACKGROUND OF THE INVENTION**

**[0003]**      The present invention relates to a communication device, such as a wireless telephone, having a plurality of independent, differently-configured keypads functionally connected to a single display panel. As used herein, the term “functionally connected” means that input from one of the elements in question affects the other element. In the context of a keypad and display panel, input from the keypad (e.g., pressing a key or rocking a joy button) affects what is displayed on the display panel (e.g., displaying a letter or number, navigating a menu, or selecting a function). Of course, the “connection” between such elements can be somewhat indirect. In the case of a keypad and display panel, a display output circuit may change what appears on the display panel in response to input from the keypad, for example.

**[0004]**      Over the past decade, the number of wireless telephone users has grown exponentially. As the number of users has grown, the demand for increased cell phone functionality has also grown. For example, wireless telephones can now be used to send and receive text messages and e-mail messages. Further, many wireless telephones have video games, calculators and other electronic programs incorporated therein.

**[0005]**      On prior art wireless telephones, each of the programs and functions is controlled using a single standard alpha-numeric telephone keypad, or a single alpha-numeric telephone keypad that has reconfigurable keys. However, because of the aforementioned variety of programs and functions, a single standard keypad or a reconfigurable alpha-numeric keypad is not user friendly and limits functionality.

**[0006] BRIEF DESCRIPTION OF THE DRAWINGS**

**[0007]** The present invention will hereinafter be described in conjunction with the appended drawing figures wherein like numerals denote like elements.

**[0008]** FIG. 1 is a perspective view of a wireless communication device in accordance with an embodiment of the invention wherein the front housing and keypads are arranged in a nested configuration.

**[0009]** FIG. 2 is a perspective view of the wireless communication device of FIG. 1 wherein the front housing has been slid in the widthwise direction to expose a QWERTY keypad.

**[0010]** FIG. 3 is a perspective view of the wireless communication device of FIG. 1 wherein the front housing has been slid in the lengthwise direction to expose a telephone keypad.

**[0011]** FIG. 4 is a perspective view of a wireless communication device in accordance with another embodiment of the invention wherein the front housing has been slid in the widthwise direction to expose a video game keypad.

**[0012] DETAILED DESCRIPTION**

**[0013]** The ensuing detailed description provides exemplary embodiments only, and is not intended to limit the scope, applicability, or configuration of the invention. Rather, the ensuing detailed description of the exemplary embodiments will provide those skilled in the art with an enabling description for implementing the exemplary embodiments of the invention. It being understood that various changes may be made in the function and

arrangement of elements without departing from the spirit and scope of the invention, as set forth in the appended claims. In addition, reference numerals that are introduced in the specification in association with a particular drawing figure may be repeated in other figures without additional description in the specification in order to provide context for other features.

**[0014]** A wireless communication device is shown in FIGS. 1-3 and is designated generally by reference numeral 10. The wireless communication device 10 generally comprises a front housing 12, a first keypad housing 14 and second keypad housing 16. Each of the keypad housings 14, 16 houses a respective keypad 15, 17. Although the wireless communication device is illustrated and described herein as having only two independent keypad housings, it will be appreciated by one of ordinary skill in the art that the device 10 could be provided with more than two independent keypad housings without departing from the scope of the present invention.

**[0015]** The front housing 12 and keypad housings 14, 16 can be arranged in various configurations by sliding the front housing 12 and keypad housings 14, 16 transversely in parallel planes relative to one another. In the “nested configuration” illustrated in FIG. 1, the front housing 12, first keypad housing 14 and second keypad housing 16 are arranged in a stacked, overlapping configuration with the front housing 12 on top, the first keypad housing 14 on the bottom, and the second keypad housing 16 in the middle. In the configurations illustrated in FIGS. 2 and 3, the front housing 12 has been moved to an “extended position” relative to the keypad housings 14, 16 so that one of the keypads 15, 17 is exposed for functional operation by a user.

**[0016]** In the extended positions shown in FIGS. 2-3, the front housing 12 is arranged in a parallel plane that is substantially non-overlapping with at least one keypad (15 or 17) so that the keys of the keypad (15 or 17) are exposed and physically accessible by a user. It should be noted that the term “keys”, as used in the specification and claims may include keys, buttons, and the like. In the extended positions shown in FIGS. 2-3, the front housing 12 overlaps the exposed keypad along a short length that connects the front housing 12 to the keypad housing (14 or 16).

**[0017]** Referring to FIG. 1, the communication device 10 has a width (W) and a length (L) that is greater than the width. Each of the keypad housings 14, 16 and the front housing 12 is generally-planar and rectangular. Each also has approximately the same length and width, but different thicknesses. The communication device 10 may be cellular telephone, a cordless telephone, a personal digital assistant, a wireless text device, or the like.

**[0018]** The front housing 12 includes a faceplate 19, an earpiece loudspeaker 18, a microphone 20, display panel 22, and a plurality of softkeys 24 arranged in the configuration shown in FIG. 1. The loudspeaker 18, microphone 20, and softkeys 24 comprise components that are well known to one of ordinary skill in the art of wireless telephones. The front housing 12 houses transceiver circuitry that provides a wireless communication link with a base station, wireless local area network, a cellular system, and/or a cordless telephone.

**[0019]** The illustrated display panel 22 has a generally rectangular shape and has the same orientation as the front housing 12. In other words, the length (LD) and width (WD) extend parallel to the length (L) and width (W), respectively, of the communication

device 10. Unlike typical wireless communication devices, the front housing 12 does not include a standard telephone keypad. Therefore, the display panel 22 can be made larger, compared to conventional wireless communication devices, without increasing footprint of the front housing 12. Referring to FIG. 1, the display panel 22 extends along at least 50% of the length of the front housing 12 so that extended alpha-numeric messages can be displayed on the display panel 22 in both landscape and portrait orientations.

**[0020]** The display panel 22 may comprise a conventional display, such as a liquid crystal display (LCD). The front housing, or one of the keypad housings, houses circuitry for receiving, processing and generating control signals for the display panel 22 such that text messages are automatically displayed. These messages, such as alpha-numeric characters 34, are displayed on the display panel 22 in the same orientation, either landscape or portrait, and in the same direction, as the graphic representations on the keys of the exposed keypad. For example, referring to FIG. 2, the characters 34 are displayed in a landscape orientation and in the same orientation as the keys on the keypad 17 exposed in this figure, whereas the characters are shown displayed in a portrait orientation and in the same orientation as the keypad 15 exposed in FIG. 3.

**[0021]** Each of the keypads 15, 17 is functionally connected to the display panel 22 on the front housing 12 and has a key configuration that is different than the other. The first, or telephone, keypad 15 has a standard telephone keypad configuration as seen in FIG. 3, and the second keypad 17 has a text entry keypad, illustrated as a Roman alphabet typewriter or computer keyboard (commonly referred to as “QWERTY”) configuration as seen in FIG. 2. However, the first, but preferably the second, keypad 15, 17 may comprise any other known keypad configuration such as the game keypad configuration

115 provided in the alternative embodiment illustrated in FIG. 4. The second, or text keypad 17, can be any suitable text entry device optimized for entry of text in a desired language, such as Chinese, Japanese or Korean. By providing a single common display panel 22 functionally connected to each of the keypads 15, 17, the cost of the communication device 10 is reduced compared to a providing a respective display panel for each keypad 15, 17.

**[0022]** The front housing 12 and keypad housings 14, 16 telescopically slide transversely relative to one another in overlapping, parallel planes. In the nested configuration, each of the keypads 15, 17 is concealed underneath the front housing 12. Each of the keypads 15, 17 can be selectively exposed by sliding the front housing 12 in the lengthwise or widthwise direction to an extended position. Referring to FIG. 2, the second or middle keypad 17 is exposed by sliding the front housing 12 in the widthwise direction.

**[0023]** Referring to FIG. 3, the first or bottom keypad 15 is exposed by sliding the front housing 12 in the lengthwise direction. Because of the manner in which the front housing 12 and keypad housings 14, 16 are connected, lengthwise movement of the front housing 12 simultaneously drags or slides the second keypad housing 16 lengthwise to expose the first keypad 15. As described above, the display panel 22 automatically displays the characters on the display panel 22 in the same orientation and direction as the keys on the exposed keypad (15 or 17).

**[0024]** The first keypad 15 is exposed only when the front housing 12 moves from the nested configuration along a first path of travel, and the second keypad 17 is exposed only when the front housing 12 moves from the nested configuration along a second path

of travel different than the first path of travel. The paths of travel are linear and transverse to one another. For example, only the middle, landscape-oriented keypad 17 is exposed when the front housing 12 slides from the nested configuration in the widthwise direction, while only the bottom, portrait-oriented keypad 15 is exposed when the front housing 12 slides from the nested configuration in the lengthwise direction. However, it should be appreciated by those skilled in the art that this configuration can be reversed without departing from the scope of the invention. In other words, the front housing 12 and keypad housings 14, 16 could be arranged so that the landscape-oriented keypad 17 is exposed when the front housing 12 slides in the lengthwise direction and the portrait-oriented keypad 15 is exposed when the front housing 12 slides in the widthwise direction.

**[0025]** In the embodiment illustrated in FIGS. 1-3, the softkeys 24 are functional when either keypad 15, 17 is exposed. Further, the softkeys 24 could be functionally connected to the display panel 22 to control different functions depending on whether the first 15 or second 17 keypad is exposed.

**[0026]** Referring to FIGS. 2-3, the front housing 12 and second keypad 17 are connected by opposed pairs of cooperating slides arranged on the widthwise-extending edges of the front housing 12 and second keypad housing 16. The slides limit movement of the front housing so that only one keypad can be exposed at a time. The widthwise edges of the front housing 12 and second keypad housing 16 have cooperating C-shaped guides 26, 28. In a similar manner, the first keypad housing 14 and second keypad housing 16 are connected by opposed pairs of cooperating slides arranged on the lengthwise-extending edges of the first 14 and second 16 keypad housings. The

lengthwise edges of the first keypad housing 14 and second keypad housing 16 have cooperating C-shaped guides 30, 32. Other types of guide arrangements, such as tongue and groove arrangements, can be used.

**[0027]** The communication device 10 is portable, and such devices typically employ a battery (not shown). It is envisioned the battery will be advantageously located within the housing 14 of the lowest keypad 15, to facilitate access for changing the battery. Alternatively, the battery may be housed within the front housing 12 or the intermediate keypad housing 16.

**[0028]** A wireless communication device 110 in accordance with another embodiment of the invention is shown in FIG. 4. Similar to the previous embodiment, the wireless communication device generally comprises a front housing 112, first keypad housing 114 and second keypad housing 116. The front housing 112 includes a faceplate 119, an earpiece loudspeaker 118, a microphone 120, display panel 122, and a plurality of softkeys 124 arranged in the configuration shown in FIG. 4. The front housing 112 and keypad housings 114, 116 are similar in construction to the wireless communication device 10 described above except that the second keypad 117 has a game pad configuration instead of a QWERTY keypad. The game pad configuration is designed to be used to play games and includes a 4-way toggle switch or joystick.

**[0029]** While the principles of the invention have been described above in connection with illustrated embodiments, it is to be clearly understood that this description is made only by way of example and not as a limitation of the scope of the invention.

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